

REMARKS

The rejection of claims 1-3, 9 and 21-23 has been obviated by revising the claims to more clearly distinguish the invention from the Prasad '517 patent. Specifically, claim 1 has been revised to recite a polishing sheet comprising a polymeric foam sheet "manufactured by a wet film forming process," wherein the polymeric foam sheet includes "a surface layer having foam cells," and a polishing layer having foam cells, said polishing layer further having a polishing face disposed on one side of said surface layer that is allowed to wear away by polishing, the polishing layer having a thickness larger than a thickness of the surface layer, and the polishing layer having an approximately uniform distribution of foam cells in a plane orthogonal to a direction of the thickness of the polymeric foam sheet, said foam cells formed in the polishing layer having an average space volume larger than an average space volume of foam cells formed in the surface layer, and wherein "essentially all of" said foam cells formed in the polishing layer are interconnected by a network of continuous holes between said foam cells.

Support for the new limitation "manufactured by a wet film forming process" is clearly present in paragraphs [0029]-[0035].

Support for the new limitation wherein "essentially all of" said foam cells formed in the polishing layer are interconnected by a network of continuous holes between said foam cells is clearly present in the last half of paragraph [0027], especially when read in conjunction with Figure 1:

In the polyurethane sheet 2, foams 3 which are approximately uniformly dispersed in the polyurethane resin. These foams 3 are communicated so as to form a network by unillustrated continuous holes whose diameter is smaller than that of the space volume of the foams. (Emphasis added.)

Such universally interconnected foams are also expressly taught by the aforementioned paragraphs [0029]-[0035], and by the penultimate sentence of paragraph [0042] as follows:

Further, because the foams 3 are formed by the deliquoring of the DMF and the control organic solvent, the foams 3 are communicated so as to form the network by the continuous holes of which diameter is smaller than that of the space volume of the foams 3. (Emphasis added.)

As further set forth in paragraph [0043], the universal interconnectedness of the foams 3 is largely responsible for the achievement of the primary object of the invention, which is the uniform polishing of a surface:

The polishing liquid is allowed to move via the continuous holes communicated between the foams 3 and it is supplied to the face of the material to be polished via the open portions 4. Accordingly, since the polishing liquid is supplied between the face of the material to be polished and the surface of the polishing pad 1, the face of the material to be polished is polished approximately evenly so that the waviness of the face of the material is improved. (Emphasis added.)

The relationship between the interconnected foams and the ability of the resulting polishing pad to uniformly polish a surface is even more clearly set forth in paragraph [0008] as follows:

Since the polishing layer has the approximately uniform foam structure in the direction of the thickness of the elastic plastic foam sheet by being formed foams whose space volume is larger than that of foams formed at the surface layer and which are communicated so as to form the network by continuous holes whose diameter is smaller than that of the space volume of the foams formed at the polishing layer, a polishing liquid containing abrasive particles is reserved by the foams which are uniformly formed at the polishing layer and is supplied to a polishing face of the material to be polished through the continuous holes at a time of polishing the material to be polished.

Accordingly, the face of the material to be polished is polished uniformly and waviness to the face of the material to be polished can be improved.
(Emphasis added.)

The Prasad '517 patent neither discloses nor suggests the invention defined in amended claim 1, for three reasons. First, claim 1 specifically recites a polymeric foam sheet "manufactured by a wet film forming process." By contrast, the polishing pad of the Prasad p517 is manufactured by a dry molding method. See for example column 13, lines 31-32 describing how the foam rods of Example 1 are "produced by an extrusion method...", and column 14, lines 45-48, describing how the foam sheets of Example 2 are formed by a

“...CO₂/polymer solution ...extruded through a flat die ...to form a porous foam sheet...” Second, while claim 1 specifically recites that “essentially all of said foam cells formed in the polishing layer are interconnected by a network of continuous holes between said foam cells,” the foams formed in the Prasad ‘517 patent are predominantly closed cells. While the Prasad foam can contain open cells, Prasad expressly teaches that at least about “5% or more” of the cells should be closed cells, as set forth in column 5, lines 21-27 below:

Typically, the porous foam comprises predominantly closed cells (i.e., pores); however, the porous foam can also comprise open cells. Preferably, the porous foam comprises at least about 5% or more (e.g., at least about 10% or more) closed cells. More preferably, the porous foam comprises at least about 20% or more (e.g., at least about 40% or more, or at least about 60% or more) closed cells.

Since the polishing liquid is allowed to move only between open cells in mutual communication, the mandatory inclusion of at least 5% closed cells taught by Prasad will result in the uneven application of the polishing liquid across the face of the surface to be polished, thus resulting in undesirable waviness. Third, claim 1 recites that the polymeric foam sheet “includes a surface layer having foam cells...” By contrast, the polishing pad of Prasad ‘517 includes no foam-containing surface layer. In the pressurized gas injection process disclosed throughout the Prasad ‘517 patent (see column 11, lines 1-11), a crystalline skin may be formed as a result of the crystallizing of the polymer surface. However, such crystalline skin has no foam structure, as is specifically recited in claim 1. Contrary to the assertion of the Examiner in the last Office Action, none of the figures of the Prasad ‘517 patent or SEM images discloses the presence of foam cells in a surface layer. For all these reasons, applicant submits that claim 1 is patentable over the art of record.

Claims 2, 3, 9 and 21-23 are each patentable at least by reason of their ultimate dependence upon claim 1.

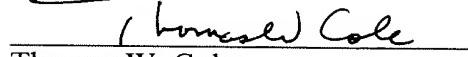
Finally, new claim 24 is patentable for its recitation that the polishing layer foam cells “are on average elongated, ...wherein the longitudinal axes of said cells is substantially parallel to a thickness direction of said polishing layer.” Support for this claim is present in Figures 5B and 5C, and the text of the specification in paragraph [0065]. New claim 25 is dependent upon new claim 24 and hence is patentable at least by reason of such dependency.

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Now that all of the claims are believed to be allowable, the prompt issuance of a Notice of Allowance is hereby earnestly solicited.

Respectfully submitted,

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